

PCT/KR2005/001792

PATENT COOPERATION TREATY

from the
INTERNATIONAL SEARCHING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) 22 SEPTEMBER 2005 (22.09.2005)

Applicant's or agent's file reference
IPN29121

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/KR2005/001792

International filing date (day/month/year)
13 JUNE 2005 (13.06.2005)

Priority date (day/month/year)
12 JUNE 2004 (12.06.2004)

International Patent Classification (IPC) or both national classification and IPC
IPC7 C12N 13/00

Applicant
Digital Bio Technology Co., Ltd. et al

1. This opinion contains indications relating to the following items:


- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/KR
 Korean Intellectual Property Office
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302-701, Republic of Korea
Facsimile No. 82-42-472-7140

Date of completion of this opinion
21 SEPTEMBER 2005 (21.09.2005)

Authorized officer
CHO, YOUNG GYUN
Telephone No. 82-42-481-8137



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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability:
citations and explanations supporting such statement

1. Statement			
Novelty (N)	Claims	1-42	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-42	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1-42	YES
	Claims	None	NO

2. Citations and explanations:

The following documents have been considered for the purpose of this written opinion:

- D1: Methods, Vol. 24(1), pp. 35-42 (2001)
D2: WO 2002/033068 A1 (ELECTRICON AB) 25 APRIL 2002
D3: WO 1999/024110 A1 (AT SCIENCE INVEST AB) 20 MAY 1999
D4: US 2003/009148 A1 (GENETRONICS, INC.) 9 JANUARY 2003

D1 discloses electroporators with a generator, an optimizer and chamber-type electrodes or tweezer-type electrodes, which generate precise square-pulses.

D2 discloses a method for penetration of lipid bilayer membranes in order to insert the tip of a hollow needle-shaped object into a container constituted by a lipid bilayer, wherein said container is placed between said needle-shaped objects equipped with a first electrode and a second electrode.

D3 discloses a method for permeabilization of a cell structure, comprising microelectrodes, power supply, electrodes and a highly focused electric field between the electrodes, in order to transfer cell impermeant solutes into the cell structure.

D4 discloses a method for in vivo electrotherapy or electroporation-mediated therapy using a needle array electrode.

1. Novelty and Inventive Step

The present invention relates to an electroporation apparatus for inserting a material into a cell by applying electric pulse, having an elongated hollow type member, a reservoir and a pressure-maintaining device; an electroporation system for inserting a material into a cell by applying electric pulse, having said electroporation apparatus and a pulse generator; and a method for electroporating cells using said electroporation system.

(Continued on Supplemental Sheet.)

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box No. V

The technical feature of this invention is to include an elongated hollow type member capable of providing a uniform electric field by applying electric pulse with a couple of electrodes from both end parts of said elongated hollow member containing cell sample.

However, none of the prior art documents discloses an electroporation system providing a uniform electric field between a couple of electrodes from both end parts of said elongated hollow member. Said electroporation system of this invention shows the reduced rate of death and the enhanced rate of transfection compared with a conventional electroporation system. Thus, the electroporation system with said elongated hollow type member would not have been obvious to a person skilled in the art from the disclosure of D1-04.

Therefore, claims 1-42 meet the requirements of novelty and inventive step under PCT Article 33(2) and 33(3).

II. Industrial Applicability

The subject matter of claims 1-42 is considered to be industrially applicable under Article 33(4). //